



103-008-CIP

TITLE

**Methods of Synthesis of Polysuccinimide, Copolymers of Polysuccinimide and
5 Derivatives thereof**

This application is a Continuation-In-Part of Applications Ser. No. 10/307,349 and
10/307,387, both filed December 2, 2002, which are a Continuation and Continuation-In-
Part, respectively, of Application Ser. No. 09/776,897, filed February 6, 2001, now US
10 Patent No. 6,495,658, issued December 17, 2002, all three of which are incorporated
herein by reference in their entirety.

BACKGROUND OF THE INVENTION

Field of the Invention

15 The present invention relates to a process for the preparation of polysuccinimide,
polysuccinimide copolymers and derivatives thereof dissolved or dispersed in a
supercritical fluid (SCF), such as liquid CO₂ or supercritical CO₂ in an organic cosolvent,
starting with an amino acid such as L-aspartic acid. Dewatering stage or concentration of
monomers may be done by any suitable technique including wiping film evaporator, drum
20 drying, evaporation in a screw reactor or inline concentrator, etc.

Discussion of the Related Art

L-aspartic acid has been produced commercially since the 1980's via immobilized
enzyme methods. The L-aspartic acid so produced mainly has been used as a component
25 of the synthetic sweetener, N-aspartylphenylalanine methyl ester (ASPARTAME®).

In a typical production pathway, a solution of ammonium maleate is converted to
fumarate via action of an immobilized enzyme, maleate isomerase, by continuous flow
over an immobilized enzyme bed. Next, the solution of ammonium fumarate is treated
with ammonia also by continuous flow of the solution over a bed of the immobilized
30 enzyme, aspartase. A relatively concentrated solution of ammonium aspartate is